

Impact of Non-Monetary Incentives on Carpenters' Productivity In South-Western Nigeria

¹O.I. Fagbenle and ²A.D. Adesanya

¹Department of Building Technology, Osun State College of Technology, Esa-Oke, NIGERIA.

²Department of Building, Obafemi Awolowo University, Ile-Ife, NIGERIA

Abstract

The research examines the effect of non-monetary incentive schemes on the productivity of carpenters in South-Western Nigeria. The primary objective was to find a relationship, if any, between the productivity of these construction operatives and the application of non-monetary incentives. The study employed the use of questionnaires and personal interview conducted on both the management and the carpenters that were drawn from large, medium and small sized construction firms within the study area. One hundred and seventy questionnaires each were distributed to the management and operatives, 103 and 118 were duly completed/returned by the management and the operatives respectively. On-site investigation and measurements were also embarked upon to study the activities of carpenters on forty (40) construction sites using six of the identified variables of non-monetary incentive schemes found to be relevant in this respect. The results indicated that the applied non-monetary incentives had significant effect on carpenters' productivity and that these incentive schemes accounted for between 6% and 25% of the variation in percentage productive time of these trades men.

Introduction

The reconstruction works that became necessary after the Nigerian civil war of 1967/1970 and the substantial rise in the demand thrust in the 1970's and early 1980's as a result of the unprecedented revenue from petroleum resources, resulted in a surge in construction activities throughout Nigeria. In order to cope with this surge, several incentive schemes were devised primarily to stimulate greater productivity from the operatives. Despite all these efforts, the productivity of the construction workers in Nigeria is still regarded to be generally low when compared to the developed countries.

Obowu (1985) in a research conducted at a staff-housing site in Kano noted that the percentage productive work done by construction workers was about 45% daily. The remaining 55% of the 9-hour working day was lost to lateness to work and lateness from break, idleness while waiting for materials, receiving instructions from supervisors and correcting badly done job. Buttressing this assertion, Ogunlana and Olomolaiye (1992) noted that on the average, workers spend approximately half of their working day, after

allowing for lunch breaks and absences, on productive work while the remaining time was not spent directly on production but rather on waiting, receiving instructions and idling. Wahab (1977) was of the view that the factors affecting the productivity in the construction industry of Nigeria are many and varied. They are shortage of building materials, the method of construction, harsh weather during construction works, workers' attitude to work conditioned by their satisfaction and absenteeism on a prolonged scale.

As perceived by Olomolaiye and Ogunlana (1989), workers' enthusiasm to produce and achieve are undoubtedly affected by their working environment. Based on these, Olomolaiye (1990) enumerated the various non-financial motivational variables as good relations with mates, good safety programme, the work itself, recognition on the job, accurate description of work, participation in decision making, good supervision, promotion, more responsibility, challenging task, job security and choosing mates, among others.

Khan (1993) reported that the importance of human factors in management including non-monetary motivation was not well

recognized until the famous Hawthorne studies were conducted in the 1920's and early 1930s. According to the author, the major implication of the Hawthorne studies was a change in management thinking that the work environment, the feeling of being part of something important and the satisfaction of having some control on one's own destiny could have a significant influence on productivity. Ayandele (1996) categorized the variety of methods in which workers are motivated as fear of the supervisor and fear of losing a job, discipline in terms of high site morale, job satisfaction and incentive schemes. Olomolaiye (1990) in his study on bricklayers' motivation concluded that motivation does not influence the rate of working. According to him, what determines how fast a worker produces is more a function of his tools, equipment and his skill. Fagbenle (1999) also reported that Skinner in 1953 advocated that monetary or non-monetary incentives (praise, recognition, promotion, etc) after a desired behaviour increase the probability of the repetition of the desired behaviour. Whereas, punishments (discipline, fines, etc) after an undesired behaviour decrease the probability of the repetition of the undesired behaviour. The same assertion was supported by Babcock (1991).

However, the use of non-monetary incentives was being researched into as against the monetary aspect owing to some the inherent dangers in the operation of the latter. In the first instance, they tend to deteriorate over a period of time due to difficulties in its administration or supervision. In fact, Olomolaiye (1990) was of the opinion that at best, they worked only when newly introduced and further described them as merely 'kicks in the ass' in the motivation process. Moreover, there is every tendency that the operatives might be made to suffer because of deviation from the planned operation that is not the making of the operatives. Such deviations include shortage of materials, bad weather, plant breakdown, non-availability of transportation owing to acute fuel shortage, etc.

The specific objectives of this study are therefore as follows:

1. To identify the various non-financial incentive schemes that are in operation in the

construction industry and also to find the premiums attached to each of them.

2. To investigate the effect of non-financial incentives on the productivity of carpenters in the Nigerian construction industry.

Data Collection

Two sets of questionnaires were prepared to sample the opinion of the management on the one hand and the carpenters' on the other. One hundred and seventy (170) copies of each set were distributed using stratified random techniques within the study area. One hundred and five were completed and returned by management of the construction firms and out of these, two (2) were wrongly filled, leaving a total of one hundred and three.

Concerning the carpenter, one hundred and eighteen were duly completed and returned. These were then categorized into large, medium and small sized firms using their registration categories with the Federal Ministry of Works and Housing. As an illustration, construction firms registered under category D were classified as large sized firms, those registered under C were classified as medium sized firms while firms registered under categories A and B were classified as small sized firms. These are further shown in Table I.

It must be however be stressed that the preliminary studies of construction firms within the study area coupled with an in-depth study of the characteristics of the various construction firms listed in the Directory of the construction firms served as a guide in the determination of the number of questionnaires to be distributed to the three categories of firms.

One-site investigation and measurements were also embarked upon to study the activities of carpenters. This was with a view to determine the output in the identified key trade. The decision to focus on carpentry in preference to other trades lies in the predominance of timbers as one of the major construction materials in Nigeria. Furthermore, the bulk of construction resources and manpower still goes into this trade. Forty (40) building and civil engineering projects being constructed for the government, public institutions, corporate organizations and private

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individuals scattered around the study area where selected in this regard. Thirteen (13) of the sites were being handled by large sized firms, fourteen (14) sites were handled by the medium sized firms and the remaining thirteen sites were handled by small sized construction firms. The contract sums ranged between #300,000.00 and #4m in this respect. Most of the projects were building works while the few civil engineering projects were on water supply to public institutions, which involved casting of concrete and drainage work. The actual production outputs in each of the identified activities, per trade, were measured using the method of observation of productivity of the end result of a key activity (for 8 hour day). Ten of such activities were studied in this carpentry trade. The operatives on each of the forty sites operated a one labourer to two carpenters and the uniformity in the gang size coupled with the mode of operation makes comparative analysis feasible. Non-monetary incentive schemes were being employed on some sites while these were completely or partially absent in other sites. For the basis of comparative analysis, however, six out of these variables of non-monetary incentives were selected owing to their visibility on site coupled with the premiums placed on each of them from the filled questionnaires. These variables are: provision of adequate working tools and equipment; transport to and from site; free medical treatment for the workers and their family members; provision of protective work devices; safety plans including the provision of first aid kits on site and end of the year party and award night.

All six variables were employed in the first twenty of these sites (I to XX) and were completely absent in the last twenty sites (XXI to XL). It must also be stressed that financial incentives were employed to a considerable extent in these two categories of sites selected for this investigation. The productivity rates for each of these two categories were measured and then compared (Tables 5 to 7).

Results and Discussions

Table 2 shows the responses of the management in large, medium and small sized firms respectively while Table 3 and 4 give the relative index of the responses of the management and operatives (carpenters)

respectively in the three categories. The Relative Motivation Index (RMI) was determined using the following fomular (Olomolaiye, 1990 and Fagbenle, 1999).

Relative Motivation Index

$$= \frac{\text{Attained Summation of } P_1U_1}{\text{Attained Summation}}$$

$$= \frac{n}{\sum P_1U_1}$$

$$= \frac{1 = 0}{N \times (4 + 3 + 2 + 1 + 0)}$$

Where,

P = Subject importance of the variable
 U = Number of respondents
 N = Number of relative motivations.

The results in Table 3 indicate that supervision based on leadership by example was mostly employed in all the three categories of the firms. These were followed by love and belonging as well as recognition through praise for significant work done. The results are also the same for the operatives (Table 4).

The coincidence is not unconnected with the conducive atmosphere created for the operative in most of the sites visited. This supports the view of Khan (1993) and Babcock (1991).

When the results of site observation measurement were compared across sites, it was discovered that the mean observed outputs in the first twenty sites

(sites I to XX) are greater than that of the last twenty sites (site XXI to XL). In fixing of hardwood rafters for example, the aggregated mean for sites I to XX is 203m while the aggregated mean for sites XXI to XXXL is 186m. This put the percentage difference (percentile variances) at 8%. The same trend was observed in the outputs of carpenters in other activities. These are shown in Tables 5 to 7.

It could also be observed from Tables 5 and 6 that for most of the activities and trade, the first set of sites (sites I to XX) have higher standard deviations than the second set of sites (sites XXI to XL).

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Table 1: Categorization of construction contractors by the Federal Ministry of Works and Housing

Category	Old Value	New Value
A	Up to #50,000	Up to #2 million
B	#50,000 - #250,000	Up to #25 million
C	#250,000 - #2 million	Up to #100 million
D	Over #2 million	Above #100 million

Source: Federal Ministry of Works and Housing

Table 2: Identification and Assessment of Non-Monetary Incentive Schemes (Management's Responses)

S/N	NON-MONETARY INCENTIVES	LARGE FIRMS					MEDIUM FIRMS					SMALL FIRMS				
		4	3	2	1	0	4	3	2	1	0	4	3	2	1	0
i	Provision of adequate working tools and equipment	16	18	0	0	0	8	10	15	1	0	8	2	3	14	8
ii	Employee training and development	1	8	23	1	0	4	0	6	21	3	1	3	4	3	24
iii	Recognition through praise for significant work done	8	17	9	0	0	11	15	6	2	0	9	20	3	2	1
iv	Encouragement to make suggestions about work	1	1	18	14	0	4	6	17	7	0	6	10	13	6	0
v	Free medical treatment for the workers and their family members	8	16	10	0	0	11	6	14	2	1	1	0	16	12	6
vi	Subsidized group/personal insurance against accidents on site.	0	0	21	12	1	1	3	12	16	2	1	2	9	16	7
vii	Transport to and from site:	15	18	1	0	0	4	11	15	3	1	1	5	3	3	23
viii	Provision of protective work devices	8	14	12	0	0	5	12	14	1	2	2	4	1	0	28
ix	Supervision based on leadership by example	12	21	1	0	0	11	21	2	0	0	12	14	8	0	1
x	Safety plans including the provision of first aid kits on site.	7	20	7	0	0	1	25	6	2	1	3	4	1	5	22
xi	Finish and go	1	1	21	9	2	6	2	14	11	1	6	5	12	9	3
xii	Provision of recreation and relaxation centres	0	15	16	1	2	0	2	9	17	6	0	2	2	1	30
xiii	End of the year cocktail party and award night	4	24	6	0	0	3	5	19	6	1	1	1	3	13	7
xiv	Love and belongingness	8	17	9	0	0	13	13	7	0	1	9	19	6	0	1

Source: Field Survey (1999).

Extent of premium:	4	-	very highly employed
	3	-	highly employed
	2	-	averagely employed
	1	-	rarely employed
	0	-	not employed

Table 3: Relative Index of Non-Monetary Incentives Premium (Management)

S/N	NON-MONETARY INCENTIVES	LARGE SIZED FIRMS R	MEDIUM SIZED FIRMS R	SMALL SIZED FIRMS R	ALL FIRMS R
i	Supervision based on leadership by example	0.81	0.79	0.76	0.79
ii	Love and belongingness	0.72	0.75	0.75	0.74
iii	Recognition through praise for significant work done	0.72	0.74	0.74	0.73
iv	Provision of adequate working tools and equipment	0.84	0.66	0.41	0.64
v	Free medical treatment for the workers and their family members	0.71	0.66	0.34	0.57
vi	Transport to and from site	0.83	0.59	0.20	0.54
vii	Safety plans including the provision of first aid kits on site	0.73	0.66	0.22	0.54
viii	Encouragement to make suggestions about work	0.41	0.54	0.61	0.52
ix	Provision of protective work devices	0.70	0.61	0.13	0.49
x	Finish and go	0.41	0.49	0.51	0.47
xi	End of the year cocktail party and award night	0.71	0.51	0.19	0.47
xii	Subsidized group/personal insurance against accidents on site	0.39	0.38	0.31	0.36
Xiii	Employee training and development	0.54	0.30	0.17	0.34
xiv	Provision of recreation and relation centres	0.56	0.29	0.08	0.31

Source: Field Survey (1999).

Table 4: Relative Index of Non-Monetary Incentives Premium (Carpenters)

S/N	NON-MONETARY INCENTIVES	LARGE SIZED FIRMS R	MEDIUM SIZED FIRMS R	SMALL SIZED FIRMS R	ALL FIRMS R
i	Supervision based on leadership by example	0.79	0.79	0.77	0.78
ii	Love and belongingness	0.69	0.74	0.81	0.75
iii	Recognition through praise for significant work done	0.69	0.73	0.74	0.72
iv	Provision of adequate working tools and equipment	0.79	0.61	0.42	0.55
v	Transport to and from site	0.83	0.66	0.16	0.55
vi	Free medical treatment for the workers and their family members	0.71	0.58	0.33	0.54
vii	Encouragement to make suggestions about work	0.41	0.54	0.64	0.53
viii	Safety plans including the provision of first aid kits on site	0.73	0.65	0.20	0.53
ix	Finish and go	0.41	0.48	0.53	0.47
x	Provision for protective work devices	0.70	0.56	0.13	0.46
xi	End of the year cocktail party and award night	0.71	0.48	0.18	0.46
xii	Subsidized group/personal insurance against accidents on site	0.39	0.38	0.30	0.36
xiii	Employee training and development	0.54	0.30	0.17	0.34
xiv	Provision of recreation and relation centres	0.49	0.28	0.07	0.28

Source: Field Survey (1999).

Table 5: Observed Outputs Per Carpenter in an 8 Hour Day (Sites I to XX)

S/N	ACTIVITIES	UNIT	AGGREGATE MEAN	S.D	MEAN					OBSERVED					OUTPUTS					PER					SITE	
				I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	XVI	XVII	XVIII	XIX	XX			
1	Fixing of hardwood rafter	M	203	9.87	-	-	-	210	-	-	220	205	-	-	-	190	195	-	-	-	-	-	200	-		
2	Fixing of hardwood purlins	M	202	10.39	-	-	-	220	-	-	200	200	-	-	-	192	190	-	-	-	-	-	210	-		
3	Fixing of fascia boards	M	204	5.16	-	-	-	210	-	-	210	200	-	-	-	200	198	-	-	-	-	-	210	-		
4	Fixing of ceiling timber	M2	11.94	0.30	-	-	-	12.10	-	-	12.10	11.88	-	-	-	11.89	19.98	-	-	-	-	-	11.78	-		
5	Fixing of corrugates asbestos sheets	M2	29.65	1.00	-	-	-	31.00	29.20	-	-	29.50	-	-	-	-	-	-	-	-	-	-	28.88	-		
6	Fixing of corrugated iron sheets	M2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
7	Fixing of door complete with locks	No s	4	0.57	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	3	4		
8	Fixing of glass louver blade	No s	80	2.00	-	-	-	-	-	-	-	-	-	-	-	-	82	-	-	-	-	-	-	78		
9	Handling of flush door fix	No s	8	0.57	-	-	-	-	-	-	8	-	-	-	-	-	9	-	-	-	-	-	-	8		
10	Fixing of metal louver	Pai rs	17	0.17	-	-	-	-	-	-	17	-	-	-	-	-	-	-	-	-	-	-	18	-		

Source: Field Survey (1999)

Note:

Mean Observed Outputs =

$$\frac{\text{Summation of all observed outputs per site}}{\text{No. of men observed}} = \text{S.D} = \text{Standard Deviation} = n$$

$$\frac{\sum (X - \bar{X})^2}{n}$$

I = 0 n

Table 6: Observed Outputs Per Carpenter in an 8 Hour Day (sites XXI to XL)

S/N	ACTIVITIES	UNIT	AGGREGATE MEAN	S.D	MEAN					OBSERVED					OUTPUTS					PER					SITE	
				XXI	XXII	XXIII	XXIV	XXV	XXVI	XXVII	XXVIII	XXIX	XXX	XXXI	XXXII	XXXIII	XXXIV	XXXV	XXXVI	XXXVII	XXXVIII	XXXIX	XL			
1	Fixing of hardwood rafter	M	186	3.74	-	-	-	-	180	-	-	-	-	-	-	185	-	-	-	-	-	188	-	190		
2	Fixing of hardwood purlins	M	188	1.80	-	-	-	-	188	-	-	-	-	-	-	188	-	-	-	-	-	190	-	185		
3	Fixing of fascia boards	M	188	2.55	-	-	-	-	185	-	-	-	-	-	-	188	-	-	-	-	-	187	-	192		
4	Fixing of ceiling timber	M2	1052	0.28	-	-	-	-	10.15	-	-	-	-	-	-	10.82	-	-	-	-	-	10.50	-	10.60		
5	Fixing of corrugates asbestos sheets	M2	27.98	0.34	-	-	-	-	27.80	-	-	-	-	-	-	28.15	-	-	-	-	-	-	-	-		
6	Fixing of corrugated iron sheets	M2	37.00	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	37.00	-			
7	Fixing of door complete with locks	Nos	3	0.57	-	-	3	-	-	-	-	-	-	-	-	-	4	-	-	-	-	3	-	-		
8	Fixing of glass louver blade	Nos	74	1.63	-	-	74	-	-	-	-	-	-	-	-	-	76	-	-	-	-	72	-	-		
9	Handling of flush door fix	Nos	7	0.57	-	-	7	-	-	-	-	-	-	-	-	-	7	-	-	-	-	8	-	-		
10	Fixing of metal louvers	Pairs	14	0.71	-	-	14	-	-	-	-	-	-	-	-	-	8	-	-	-	-	-	-	-		

Source: Field Survey (1999)

Note:

Mean Observed Outputs =

Summation of all observed outputs per site = S.D = Standard Deviation = $\frac{\sum(X - \bar{X})^2}{n}$

No. of men observed

$$\frac{\sum(X - \bar{X})^2}{n}$$

Table 7: Comparison Between Outputs On Sites I to XX and Sites XXI to XL

S/N	ACTIVITIES	UNIT	DIFFERENCE IN AGGREGATED MEAN (%)
1	Fixing of hardwood rafters	M	8
2	Fixing of hardwood purlins	M	7
3	Fixing of fascia boards	M	8
4	Fixing of ceiling timber	M2	12
5	Fixing of corrugated asbestos sheets	M2	6
6	Fixing of corrugated iron sheets	M2	-
7	Fixing of door complete with locks	Nos	25
8	Fixing of glass louver blades	Nos	8
9	Handling of flush door fix	Nos	13
10	Fixing of metal louver	Pairs	18

Source: Field Survey (1999)

Note: Percentage Difference =

$$\frac{\text{Aggregated means in sites I to XX} - \text{Aggregated means in sites XXI to XL}}{\text{Aggregated mean in sites I to XX}} \times 100$$

Aggregated mean in sites I to XX

1